

## The Math Blame Game

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The temptation to ‘blame’ students, their parents and former math teachers, the curriculum, the school system, and society as a whole (but never me!) for students’ lack of mathematical knowledge seems linked to the very act of teaching mathematics. To remain calm when faced with a student struggling with ‘basic’ mathematical facts is a difficult challenge that many members of our community experience on a daily basis.

On the other hand, being on the receiving end of the math blame game could be one of those negative experiences with math that stay with students forever. Therefore, as the Cherokee legend about the two wolves advises, a math instructor should always stay positive and keep in mind the two ultimate goals: (a) helping students recognize mathematics and its importance in everyday life, and (b) helping students discover their talent for mathematics.

Mathematical facts and techniques, at any level, can be difficult to master for many, to say nothing of easy to forget for almost everyone. We passionately teach our students those facts and techniques, introducing mathematical ideas with a strong conviction that this knowledge is necessary to describe and understand the world that we live in. The measure of a math teacher’s success, in my opinion, is whether, years later, his or her former students still have a positive attitude towards mathematics in general as well as a willingness to learn or re-learn the mathematics they might need at the moment.

All students enrolled in the differential calculus course at Simon Fraser University are asked to take a so-called diagnostic test. The test is a reasonable (i.e., the difficulty level of the questions ranges from ‘easy’ to ‘medium’) collection of problems from high school mathematics. Even though all of our students come to this class with at least a B in BC Math 12, about one third of them are not able to pass the test. Moreover, among those students who do pass the test, there are many who will still be truly challenged to meet expectations in this dense course.

It is part of the tradition of university and college math instructors to shake their heads and sigh when they see their students struggle to manipulate various mathematical expressions. Regardless of the fact that calculus courses are often based on the assumption that students have knowledge about everything that they ever heard during their 13 years of pre-university mathematics, one of the most common comments struggling students hear from their instructor is, “You were supposed to learn this in Grade...”

I confess to committing this 'crime' in my heart many times. For example, during a recent *Jeopardy* episode, none of the contestants – three smart and well-educated people – could recognize a quadratic equation. The teacher in me thought, *They were supposed to learn this in...* (To be fair, they probably did; they just could not recall the fact at the moment.)

The idea of the cartoon (©Veselin Jungic and Simon Roy) below is to address the issue that many parents and math instructors face at all levels: Students have difficulties handling 'elementary' math facts or techniques that they were *supposed* to have learned at some earlier stage of their math education. The cartoon mimics the basic case in mathematical induction; the viewer's imagination can make the inductive step.

